

**SILICON ON INSULATOR MICRORESONATOR SENSORS AND  
MODULATORS AND METHOD OF OPERATING THE SAME**

**Abstract of the Disclosure**

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A microsensor for sensing a substance comprises a substrate, a source of light, an optical microresonator or semiconductor optical ring microresonator fabricated in the substrate exposed to the substance to allow an interaction between the microresonator and substance, a waveguide coupling the source of light to the optical microresonator, and a detector coupled to the microresonator to measure the resonant frequency of the microresonator, the absorption loss of whispering gallery modes in the microresonator or the quality factor of the microresonator, which are sensitive to interaction of the substance with the optical microresonator. . A polymer coating disposed on the microresonator is reactive with the substance. The microsensor may comprise a plurality of microresonators corresponding to a plurality of different resonant frequencies to generate an absorption spectrum of the substance.

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